AN interesting paper on the destruction of wolves in France appears in the current number of the *Revue Scientifique*. The law in virtue of which rewards are given for the killing of wolves was passed on August 3, 1882, and during the last four months of that year 423 were destroyed. In 1883 the number killed was 1316, the sum paid in rewards being 104,450 francs. The number was 1035 in 1884; 900 in 1885; 760 in 1886; 701 in 1887; 505 in 1888; 515 in 1889. The departments in which most animals have been slain are Dordogne and Charente. It is believed that very soon no specimens will be left in France except those which occasionally reach it from neighbouring countries.

IT has been a practical difficulty in the use of electrical accumulators, to know, at any given time, to what extent they are charged or discharged. M. Roux, we learn from *La Nature*, has devised an indicator of charge, based on the principle that the mean density of the liquid varies according to the quantity of electricity stored. He uses a flattened glass tube, of length about equal to the depth of the liquid, and weighted so as to be heavier than the thrust it receives. It is hung by means of a platinum wire to one end of a short lever, pivoted in the middle, and having a weight on the other arm; with full charge, this lever is horizontal. At right angles to the lever is a weighted pointer, which gives indication on a horizontal scale above, with 100 divisions; the pointer, vertical at 100 when the accumulator is charged, stands at 45 after discharge. The readings on the scale indicate directly the percentage ratio of the quantity remaining in the accumulator to that of saturation. By means of electric contacts, &c., the state of charge can be announced. M. Roux finds by experiments the differences between indications of his apparatus and those of an ampere-meter placed in the circuit to have been always less than 3 per cent., which is considered very satisfactory, the object being industrial.

THE *Annals of the Astronomical Observatory of Harvard College*, vol. xxi. Part ii., contains a summary of the meteorological observations made in the year 1889 under the auspices of the New England Meteorological Society, and three investigations dealing respectively with types of New England weather, land and sea-breezes, and the characteristics of the New England climate. These essays are of a very exhaustive nature, and should be of much use to meteorologists.

THE recent earthquake in Algiers did little damage in the town itself. The first shock, which occurred at 4 a.m. (on the morning of January 15), was followed by a more violent one at 4h. 10m. lasting 12 seconds. Slight shocks were also experienced at 5 a.m. and at 7 a.m. The direction of the shocks was from south east to north-west. The inhabitants fled from their houses to the open places. The shocks were most violent at Gouraya, near Cherchel, which also suffered. In Philippeville two persons were killed and many injured by the fall of a house. In Villebourg many houses are in ruins; and numerous lives were lost there, and at Blidah, Medeah, and Orleansville.

THE journals of Nismes record three deaths in that neighbourhood resulting from poisoning by *Amanita citrina*, which appears, at least in the south of Europe, to be one of the most deadly of Fungi.

A "FLORA OF PALESTINE" is in progress edited by the Rev. G. E. Post, and is now completed as far as the end of the order *Umbelliferæ*. Several new species are described.

THE death is announced, on January 24, of Dr. Philip Carl, Professor of Physics at the Munich Royal Military College, and late editor of the *Repertorium für physikalische Technik* and the *Zeitschrift für Elektrotechnik*.

CAPTAIN ABNEY will deliver at the Society of Arts a course of five popular lectures on "The Science of Colour," on the following Friday afternoons, at half-past four o'clock:—February 13, 20, 27, March 6, 13. The lectures will be popular and elementary, and fully illustrated by experiments.

THE atomic weight of rhodium has been redetermined by Prof. Seubert and Dr. Kobbé, of the University of Tübingen, and an account of their results is published in the current number of *Liebig's Annalen*. During the last few years the atomic weights of the other five metals of the platinum group, ruthenium, palladium, iridium, platinum, and osmium, have formed the subjects of most careful investigations, mainly at the hands of Prof. Seubert, with the result that these values are considered as among the best determined of all atomic weights. The remaining metal, rhodium, must now be added to the list, for the present redetermination leaves no doubt whatever that the real value of this atomic weight has been arrived at within the ordinary limits of inevitable experimental error. The two principal former determinations afforded widely different results. That of Berzelius, in 1828, from an analysis of the salt $4KCl . Rh_2Cl_6$, gave the number 104·07; while Jörgensen, in 1883, employing the ammoniacal salt, $Rh_2(NH_3)_{10}Cl_6$, deduced the value 103·00 ($O = 16$) or 102·74 ($O = 15·96$). In the present redetermination, Seubert and Kobbé made use of the same ammoniacal compound as Jörgensen. Fine crystals of this salt are readily prepared in a state of purity, they are very stable in the air, and the salt lends itself readily to accurate analysis. It was thus in all respects eminently suitable for the purpose of an atomic weight investigation. The experimental method of treatment which was found to be attended with least possibility of error consisted in reducing the heated salt in a current of pure hydrogen to metallic rhodium, and thus determining the ratio of the weight of salt to its content of rhodium. The finely powdered crystals, after drying at 100° C., were weighed in a porcelain boat; the boat and its contents were then placed in a combustion-tube lined internally with a cylinder of platinum, the tube was gradually heated in the furnace, and a stream of hydrogen passed through. After complete reduction, and displacement of the hydrogen by a current of carbon dioxide, the metallic rhodium was found in the boat in the form of a bright grey rod. The boat and metal were then again weighed. Ten such experiments yielded values ranging, when $O = 15·96$, from 102·61 to 102·81. As the final mean, the number 102·7 is adopted; or, if $O = 16$, the round number 103·0. These values confirm those obtained by Jörgensen in an exceptionally satisfactory manner, thus setting the question finally at rest. Rhodium, therefore, retains the place in the periodic system marked out for it by its chemical behaviour, between ruthenium, of atomic weight 101·4, and Pd 106·3, and in the same vertical group as its analogue iridium.

THE additions to the Zoological Society's Gardens during the past week include two Malbrouck Monkeys (*Cercopithecus cynosurus* ♂ ♀) from West Africa, presented respectively by Mr. J. P. Heseltine and Mrs. Newton; two Common Peafowls (*Pavo cristatus* ♀ ♀), bred in Scotland, presented by Mr. Richard Hunter; two Globose Curassows (*Crax globicera* ♂ ♀), two Mexican Guans (*Penelope purpurascens*) from Central America, a Daubenton's Curassow (*Crax daubentoni* ♂) from Venezuela, deposited.

OUR ASTRONOMICAL COLUMN.

"ANNUAIRE DU BUREAU DES LONGITUDES."—This extremely useful and unique *Annuaire* for 1891 has just been published. The astronomical information is as complete as could be desired. The tables of physical and chemical constants are of the same comprehensive character. MM. Lœwy and Schulhof give an account of the comets that appeared between 1800 and 1826, and in 1889. This list completes those given from 1882 to 1890, and forms with them a catalogue that contains references to every published comet observation made this century. A table of sixty-two double stars, of which the elements are known,

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is given for the first time by M. Glasenapp. Another table, constructed by M. Bossert, contains the proper motions of sixty-nine stars. M. Cornu contributes a succinct description of three types of stellar spectra, and an interesting article on the astronomical applications of Doppler's or Fizeau's principle. M. Janssen gives an account of his ascent of Mont Blanc for the purpose of studying the telluric spectrum. M. Tisserand points out the uses of the minor planets, and discusses the communications made at the International Conference on Degree Measurements, held at Freiburg on September 15, 1890. In the portion of the work devoted to terrestrial magnetism, mention is made of anomalous disturbances similar to those found by Profs. Rücker and Thorpe in England. Many other important points are brought together, and the whole stands forth as a *vade mecum* having no equal.

United States Naval Observatory.—Captain F. V. McNair, the Superintendent of this Observatory, has recently issued his report for the year ending June 30, 1890. Prof. A. Hall has used the 26-inch equatorial for observations of double stars, Saturn and its satellites, and Mars. The reduction of these observations is now in progress. Prof. Harkness has employed the transit circle in observations of the sun, major and minor planets, and certain stars for clock and instrumental corrections. The 9·6-inch equatorial has been used by Prof. Frisby for observations of comets, minor planets, and occultations of stars by the moon. Lieut. Hodges has made observations with the meridian transit instrument. Mr. Paul has continued the observations of his new Algol-type variable, S Antliæ, referred to in the last report. The reductions show that the period deduced by Mr. Chandler in the *Astronomical Journal*, No. 190, viz. 7h. 46m. 48·0s., will be changed by only a very small fraction of a second. The magnetic observations and testing of chronometers have been continued as usual. As in many other Observatories, it is complained that the staff is insufficient to reduce and discuss the astronomical, geodetic, gravitational, and tidal observations that are made.

A New Theory of Jupiter and Saturn.—In the Astronomical Papers prepared for the use of the American Ephemeris and Nautical Almanac, vol. iv., Mr. G. W. Hill develops a new theory of the movements of Jupiter and Saturn. The guiding principle of the investigation was "to form theories of Jupiter and Saturn which would be practically serviceable for a space of three hundred years on each side of a central epoch taken near the centre of gravity of all the times of observation: theories whose errors in this interval would simply result not from neglected terms in the developments, but from the unavoidable imperfections in the values of the arbitrary constants and masses adopted from the indications of observation." It is seven and a half years ago since the necessarily laborious computations were commenced, and many years must elapse before any verdict can be given as to their accuracy. The theory appears, however, perfect, and the author is to be sincerely congratulated upon its development.

Argelander-Oeltzen Star Catalogue.—Dr. E. Weiss has completed his comparison of the stars contained in the catalogue constructed by Oeltzen from Argelander's southern zones and reduction-tables, with those contained in Schönfeld's Southern *Durchmusterung* and the Cordoba Catalogue. The work forms a supplementary volume to the Annals of the Observatory of Vienna University. The places of 18,276 stars are given for 1850, and the value of total precession which will enable them to be determined for the mean epoch 1875·0. About 1000 stars had to be examined with the Vienna equatorial, because they were not contained in the Cordoba zones, and 200 others for verification of position. Very few differences of magnitude have been found, and these were only of small amount. Argelander's Catalogue has always been of extreme value to astronomers. Prof. Weiss's revise renders its usefulness inestimable.

TECHNICAL INSTRUCTION IN ESSEX.[1]

The Council of the Essex Field Club proposes to establish, at the cost of the Club, in Chelmsford (chosen not only as the county town, but also as being a central position in Essex), a public Museum to illustrate the natural productions, the geology and physiography, and the industries and manufactures of Essex, together with an educational series of specimens and preparations, which may be employed for teaching purposes. The Museum will also contain a library of books, maps, parliamentary papers, pictures, &c., treating of the natural history, geology, topography, history, and industries of Essex, as well as a general library of books necessary for the study of the before-mentioned subjects.

The Council of the Club is very desirous that the Museum shall be of the greatest possible service in promoting the study and love of science and its applications to industries and manufactures, and as a subject of general education. In the endeavour to carry out these objects, the Club most respectfully asks for the aid of the County Council of Essex, in accordance with the powers given by the above-mentioned Acts.

The leading features of the technical education scheme of the Essex Field Club are as follows:—

(1) The establishment of a central institution in Chelmsford in connection with the Club's Museum, with large laboratories and class-room, furnished with apparatus and preparations for practical teaching, and in which, as occasion may arise, examinations could be conducted; the institution being also amply provided with lecturing and class-teaching appliances (lanterns, slides, diagrams, apparatus, models, materials, and specimens) so arranged in travelling cases that they could be easily sent to any part of the county for use at the local lectures and classes.

(2) The arrangement of peripatetic courses of classes and lectures, conducted by specially qualified teachers (either supplemental to local efforts, or at the sole instance and cost of the institution) for imparting instruction in science and technology in any parts of the county, particularly in rural and maritime districts. The teaching given to be either elementary or more advanced, but always, as far as possible, of a thoroughly practical character, and such as will give a knowledge of things rather than words, and develop the faculties of seeing and doing.

The most important of the subjects proposed to be taught may thus be grouped:—

(*a*) Elementary drawing, practical geometry, carpentry, modelling, &c., and their applications in the study and practice of the following subjects.

(*b*) Practical elementary physics and chemistry, and their applications in agriculture, industries, &c.

(*c*) Biology, including practical botany and the principles of vegetable physiology, and their applications in agriculture, gardening, &c.

(*d*) The principles of geology and mineralogy, and their applications in agriculture, water-supply, &c.

(*e*) Human physiology and the laws of health or hygiene.

(*f*) Geography and physiography, including practical meteorology.

(*g*) The principles and practice of agriculture and agricultural chemistry, live-stock management, fruit-growing and preserving, dairy management, &c.

(*h*) Forestry, arboriculture, and gardening.

(*i*) The structure, life-histories, diseases, distribution, &c., of fish, molluscs, crustacea, &c., with special reference to the Essex fisheries, oyster culture, &c.

(*j*) Courses of instruction on the diseases of plants and animals, and on beneficial and injurious birds, insects, injurious fungi, &c.

(*k*) Special courses of instruction on the scientific principles and practice of any local industries.

(*l*) Navigation, fishing, &c.

(*m*) Cookery and minor domestic industries.

The stock of apparatus, models, preparations, maps, specimens, &c., in the central institution would allow of the teaching in these lectures and classes being illustrated and made practical in a way that would be impossible in the case of rural centres and villages under any other system. In schemes of elementary, scientific, and technical instruction hitherto put forward, towns and populous centres have alone been considered. The present scheme would permit of the best kind of instruction being given not only in towns but also in rural and maritime districts, and that at a minimum cost. It should be noted also that if in the future an extension of the institution in any direction should be considered desirable by the County Council of Essex, the plans proposed will readily allow of such development without any interference with the work then being carried on.

The museum, laboratories, and class-room would also be serviceable:—

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[1] Abstract of scheme put forward by the Council of the Essex Field Club (under the Technical Instruction Act, 1889; the Local Taxation Act, 1890; and in accordance with the regulations of the Science and Art Department).

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